

Conference Program

Tuesday, March 27

7:30 AM Registration/Attendee Check-in, Coffee

CONFERENCE OPENING

8:30 AM Conference Opening
David Seiler, NIST, Conference Chair

8:45 AM Introduction and Welcome to NIST
William A. Jeffrey, Director, NIST

Session 1: Nanotechnology and Metrology Across Government, Industry, and University

Session Chair: Robert Doering, TI

9:00 AM There's Plenty of Difficulty Near the Bottom
Mark Durcan, COO, Micron

9:45 AM Advanced CMOS and Related Characterization in MIRAI Project
Hisatsune Watanabe, President and CEO, Selete

10:30 AM Coffee Break and Poster Viewing

11:00 AM CEA-LETI as a European Model of Cooperation in Nanoelectronics
Michel Brillouett, CEA/LETI

11:45 AM The Semiconductor Industry's Nanoelectronics Research Initiative: Motivation and Challenges
Jeff Welser, IBM, NRI Representative

12:30 PM Lunch and Poster Viewing

Session 2: Technology Overview for Nanoelectronics and Metrology

Session Chair: E. Clayton Teague, National Nanotechnology Coordination Office

- 1:50 PM** Metrology and Precision for Nanoscale Manufacturing
Tom Theis, IBM
- 2:20 PM** Characterization and Metrology for Nanoelectronics
Alain Diebold, SEMATECH
- 2:50 PM** Metrology for Emerging Research Materials and Devices
Mike Garner, Intel
- 3:20 PM** Coffee Break and Poster Viewing

Session 3: Electrical Measurements at Nano Dimensions

Session Chair: Hal Edwards, TI

- 3:50 PM** Ultra Shallow Junction Metrology: From 0D to 3D Analysis
Wilfried Vandervorst, IMEC
- 4:20 PM** Scanning Probes of Local Electrical Properties
Dawn Bonnell, Univ. of PA
- 4:50 PM -
5:50 PM** Poster Session
- 6:30 PM** Banquet at Hotel
From Microchips to Nanochips: How We Got Here...and...Where Do We Go
from Here
Dan Hutcheson, VLSI Research

Wednesday, March 28

Session 4: Metrology for CMOS Extension

Session Chair: Lori Nye, Entegris

- 8:00 AM** Analytics and metrology for locally strained silicon in CMOS devices
Michael Hecker, AMD Dresden/Germany
- 8:30 AM** New Materials and Structures for Transistors Based on Spin, Charge and
Wavefunction Phase Control
Sanjay Banerjee, University of Texas at Austin
- 9:00 AM** Advanced Metrology for Nanoelectronics at NIST
Stephen Knight, NIST
- 9:30 AM** Coffee Break and Poster Viewing

Session 5: Metrology for Beyond CMOS and Extreme CMOS Devices

Session Chair: Amal Chabli, LETI

- 10:00 AM** Nanoscale Probing of Magnetism
Kathryn Moler, Stanford
- 10:30 AM** Self-assembled Monolayers: Surface Engineering and Characterization
Fabrice Sinapi, IMEC Leuven/Belgium
- 11:00 AM** Dynamics of Nanoscale Contact Formation
John Boland, Trinity College
- 11:30 AM** Dedicated Poster Viewing Break
- 12:00 PM** Raman Antenna Effect in Semiconducting Nanowires
Peter Eckland, Penn State

Session 6: Interconnects from Copper –Low K to 3D to Optical

Session Chair: J.D. Luttmer, TI

- 12:30 PM** Mechanical Stability of Cu/Low-k Interconnect Stacks: Measurement Strategies for
Mechanical Properties
Anand Vairagar, AMD Dresden/Germany
- 1:00 PM** Lunch and Poster Viewing
- 2:20 PM** Metrology of Silicide Contacts for Future CMOS
Stefan Zollner, Freescale
- 2:50 PM** Carbon Nanotube (CNT) via Interconnect Technologies
Yuji Awano, Fujitsu
- 3:20 PM** What Is 3D IC Integration and What Metrology is Needed?
Patrick Leduc, CEA-LETI
- 3:50 PM** Poster Session (Wine and Cheese)
- 5:20 PM**
- 6:15 PM** Barbecue at Smokey Glen Farm

Thursday, March 29

Session 7: Microscopy for Nanoelectronics

Session Chair: Michael Postek, NIST

- 8:00 AM** Three-Dimensional Imaging of Nanostructures Using Electron Tomography, and the Impact of Aberration Correctors
Peter Ercius, Cornell
- 8:30 AM** An Introduction to the Helium Ion Microscope
John Notte, ALIS, Peabody, MA
- 9:00 AM** The Future of the SEM
David Joy, Univ. TN
- 9:30 AM** Coffee Break and Poster Viewing

Session 8: New Characterization Methods

Session Chair: Stephanie Watts Butler, TI

- 10:00 AM** Review of NSOM Microscopy for Materials
Yannick De Wilde, Groupe de Physique des Matériaux, CNRS, France
- 10:30 AM** Optical Characterization Methods for Identifying Charge Trapping States in Thin Dielectric Films
Jimmy Price, SEMATECH, Austin, TX
- 11:00 AM** LEAP Tomography and the Rapidly Expanding World of Microelectronic Applications
Tom Kelly, Imago, Madison, WI, and Paul Ronsheim, IBM, Hopewell Junction, NY
- 11:30 AM** Dedicated Poster Viewing Break

Session 9: Theory, Modeling, and Simulation

Session Chair: Rajinder Khosla, NSF

- 12:00 PM** Doping Nanocrystals and the Role of Quantum Confinement
Jim Chelikowsky, UT Austin
- 12:30 PM** Nanoelectronics: Metrology and Computation
Mark Lundstrom, Purdue
- 1:00 PM** Lunch and Poster Viewing

Session 10: Metrology for CMOS Extension (Continued)

Session Chair: Lori Nye, Entegris

2:20 PM Metrology and Characterization for Extending Silicon CMOS
Toshihiko Kanayama, AIST, Onogawa, Japan

Session 11: Metrology for Patterning

Session Chair: Omkaram Nalamasu, Applied Materials

2:50 PM EUV Lithography: New Metrology Challenges
Obert Wood, Advanced Micro Devices

3:20 PM Topic to be determined
Speaker to be determined

3:50 PM Poster Session (Wine and Cheese)

5:20 PM

Contributed Poster Papers

- 001** Leakage Current and Dopant Activation Characterization of SDE/Halo CMOS Junctions with Non-contact Junction Photo-voltage Metrology
V. N. Faifer¹, D. K. Schroder², M. I. Current¹, T. Clarysse³, P. J. Timans⁴, T. Zangerle^{3,5}, W. Vandervorst^{3,6}, T. M. H. Wong¹, A. Moussa³, S. McCoy⁷, J. Gelpey⁷, W. Lerch⁸, S. Paul⁸, and D. Bolze⁹
¹Frontier Semiconductor, San Jose CA
²Department of Electrical Engineering, Arizona State University, Tempe, AZ
³IMEC, Leuven, Belgium
⁴Mattson Technology, Inc., Fremont, CA
⁵Université de Liège, Applied Sciences Faculty, Liège, Belgium
⁶K.U. Leuven, Electrical Engineering Dept., INSYS, Leuven, Belgium
⁷Mattson Technology Canada, Inc., Vancouver, Canada
⁸Mattson Thermal Products GmbH, Dornstardt, Germany
⁹IHP Im Technologiepark, Frankfurt (Oder), Germany
- 002** NIST Traceable Small Signal Surface Photo Voltage Reference Wafer
A. Bertuch and K. Steeples
QC Solutions, Billerica, MA
- 003** Micro-probe CV and IV Characterization of Thin Dielectric Films in Product-wafer Scribe-line Structures
A. Feng, V. N. Faifer, and M. I. Current
Frontier Semiconductor, San Jose, CA
- 004** Dopant Activation and Profile Determination with an Elastic Material Probe (EM-Probe)
R. J. Hillard,¹ W. C. Ye,¹ and J. O. Borland²
¹Solid State Measurements, Inc., Pittsburgh, PA
²JOB Technologies, Aiea, Hawaii
- 005** Direct Monitoring of EOT-JLEAK Characteristics for SiON and High-k Gate Dielectrics
R. J. Hillard,¹ C. E. Kalnas,¹ and H. Umeda²
¹Solid State Measurements, Inc., Pittsburgh, PA
²Renesas, Hyogo, Japan
- 006** Application of Non-Contact Corona-Kelvin Metrology for Characterization of Plasma Nitrided SiO₂
A. Belyaev, D. Marinskiy, M. Wilson, J. D'Amico, L. Jastrzebski, and J. Lagowski
Semiconductor Diagnostics Inc., Tampa, FL
- 007** The Continuous Anodic Oxide Technique
S. Prussin
UCLA, Department of Engineering, Los Angeles, CA

- 008** Electrical Properties of Hybrid-Orientation Silicon Bonded Interfaces
M. C. Wagener,¹ R. H. Zhang,¹ M. Seacrist,² M. Ries,² and G. A. Rozgonyi¹
¹*North Carolina State University, Raleigh, NC*
²*MEMC Electronic Materials, St. Peters, MO*
- 009** Withdrawn
- 010** Methods to Characterize the Electrical Properties of Silicon Nanowires
Q. Li,¹ S-M. Koo,² M. D. Edelstein,¹ J. S. Suehle,¹ X. Zhu,^{1,3} D. E. Ioannou,³ and C A. Richter¹
¹*National Institute of Standards and Technology, Gaithersburg, MD*
²*Kwangwoon University, Seoul, Korea*
³*George Mason University, Fairfax, VA*
- 011** A Review of Quantum Dot Based Metrology for Self-Assembled Molecular Devices
J. Ruan,¹ S. Raghunathan,¹ J. Hartley,¹ E. Akin,² N. Portney,² and M. Ozkan²
¹*State University of New York, Albany, NY*
²*University of California, Riverside, CA*
- 012** Development of SET Logic Devices
N. M. Zimmerman, E. Hourdakis, B. Simonds, A. Fujiwara, H. Inokawa, and Y. Ono
National Institute of Standards and Technology, Gaithersburg, MD
- 013** Dielectric Characterization of a High-k Polymer Designed as a Gate Dielectric Material in Organic Thin Film Transistors
T. Psurek,¹ N. Shin,² D. M. DeLongchamp,¹ E. K. Lin,¹ and D. Y. Yoon²
¹*National Institute of Standards and Technology, Gaithersburg, MD*
²*Seoul National University, Seoul, Korea*
- 014** Withdrawn
- 015** The Characterization of Silicon-based Molecular Devices
N. Gergel-Hackett, C. A. Hacker, L. J. Richter, O. A. Kirillov, and C. A. Richter
National Institute of Standards and Technology, Gaithersburg, MD
- 016** SEMPA Imaging for Spintronic Applications
J. Unguris, D. T. Pierce, and S-H. Chung
National Institute of Standards and Technology, Gaithersburg, MD
- 017** Inelastic Electron Tunneling Spectroscopy of a Molecular Magnetic Tunnel Junction
W. Wang and C. A. Richter
National Institute of Standards and Technology, Gaithersburg, MD
- 018** AC Impedance Measurement of Individual Single Wall Carbon Nanotubes
J. Obrzut,¹ K. Migler,¹ L. Dong,² and J. Jiao²
¹*National Institute of Standards and Technology, Gaithersburg, MD*
²*Portland State University, Portland, Oregon*

- 019** Embedded Electrical Test Structure for In Situ Local Mechanical Stress Monitoring
M. Kasbari,¹ R. Delamare,¹ S. Blayac,¹ C. Rivero,² O. Bostrom,² and R. Fortunier¹
¹*Ecole des Mines de Saint-Etienne - Centre de Microélectronique de Provence, Gardanne, France*
²*STMicroelectronics, Rousset, France*
- 020** Ultra Low- κ Metrology Using X-Ray Reflectivity and Small-Angle X-ray Scattering Techniques
L. Plantier,¹ J-P. Gonchond,² F. Pernot,³ A. Peled,³ C. Wyon,⁴ and J-C. Royer⁴
¹*Freescale Semiconductor, Crolles, France*
²*STMicroelectronics, Crolles, France*
³*Jordan Valley, Migdal Ha'Emek, Israel*
⁴*CEA/LETI, Grenoble, France*
- 021** Under-bump Metallization (UBM) Control Using X-ray Fluorescence (XRF)
D. Agnihotri, D. Brown, J. Imhof, J. O'Dell, and A. Tokar
Jordan Valley Semiconductors, Inc., Austin, TX
- 022** Characterization of Copper Line Array Erosion with Picosecond Ultrasonics
N. Pic,¹ G. Tas,² D. Alliata,² and J. Clerico²
¹*STMicroelectronics ZI de Rousset, Cedex, France*
²*Rudolph Technologies, Flanders, NJ*
- 023** Investigation of In-line Process Monitoring for Porous SiOCH
D. Fossati,¹ C. Beitia,² L. Plantier,³ G. Imbert,¹ L. Yu,⁴ F. Volpi,⁵ and J-C. Royer⁶
¹*STMicroelectronics, Crolles, France*
²*KLA-Tencor, Meylan, France*
³*Freescale Semiconductor, Crolles, France*
⁴*KLA-Tencor, Shanghai, China*
⁵*LTPCM, St Martin d'Hères, France*
⁶*CEA/LETI, Grenoble, France*
- 024** Blotch-like Defects Formed in Ti-PVD Film: a Metrology Issue
Y. Uritsky, I. Wilke, C. Wang, C. Lazik, A. Anapolsky, and B. Hernandez
Applied Materials, Santa Clara, CA
- 025** Near-Field Scanning Probe Microwave Microscope for Non-contact Electrical Metrology of Nano-Interconnect Materials and Devices
V. V. Talanov and A. R. Schwartz
Neocera, Inc., Beltsville, MD
- 026** Metrologies, Materials and Processes for Interconnect Fabrication
D. Josell, D. Wheeler, and T. P. Moffa
National Institute of Standards and Technology, Gaithersburg, MD
- 027** C-V Characterization of Single-grain MOS Capacitors Using an SEM-based Nanoprobe
T. Zheng, H. Jia, R. M. Wallace, and B. E. Gnade
University of Texas at Dallas, Richardson, TX

- 028** Dopant Profiling in the TEM, Progress Towards Quantitative Electron Holography
D. Cooper,¹ R. Truche,¹ J-L. Rouviere,¹ A. Chabli,¹ A. C. Twitchett,² P. A. Midgley,² and R. E. Dunin-Borkowski²
¹*CEA LETI, Grenoble, France*
²*University of Cambridge, Cambridge, UK*
- 029** Energy-filtered Photoelectron Emission Microscopy with NanoESCA for Imaging Nanoelectronic Materials
O. Renault, A. Baily, A. Chabli
CEA-LETI, MINATEC, Grenoble, Cedex 09, France
- 030** A Method for Precise TEM Sample Preparation in Semiconductor Devices
J-L. Lue, T-F. Chang, J-C. Chen, and T. Wang
ProMOS Technologies Inc., Hsinchu, Taiwan
- 031** Computational Scanning Electron Microscopy
L. Baghaei Rad, H. Feng, J. Ye, and R. F. Pease
Stanford University, Stanford, CA
- 032** Chemical Sample Characterisation on the Nanoscale: Imaging XPS and Scanning Auger Microscopy with Ultimate Spatial Resolution
J. Westermann,¹ T. Berghaus,¹ M. Maier,¹ D. Funnemann,¹ K. Winkler,¹ N. Barrett,² and O. Renault³
¹*Omicron NanoTechnology GmbH, Germany*
²*CEA-DSM/DRECAM/SPCSI, CEA Saclay, France*
³*CEA-Leti, Minatec, France*
- 033** Off-Specular Neutron and X-ray Reflectometry for the Structural Characterization of Buried Interfaces
K. A. Lavery, V. M. Prabhu, E. K. Lin, and W-l. Wu
National Institute of Standards and Technology, Gaithersburg, MD
- 034** Ion Profiling of Implanted Dopants in Si (001) with Excess Vacancy Concentration
M. Dalponte,¹ H. Boudinov,¹ L. V. Goncharova,² T. Feng,² E. Garfunkel,² and T. Gustafsson²
¹*Universidade Federal do Rio Grande do Sul, Porto Alegre, Brazil*
²*Rutgers University, Piscataway, NJ*
- 035** Withdrawn
- 036** Photo-Reflectance Characterization of Nanometer Scale Active Layers in Si
W. Chism
Xitronix Corporation, Austin, TX

- 037** Process Monitoring and Surface Characterization by XPS in a Semiconductor Fabrication Line
N. Cabuil,¹ A. Le Gouil,¹ B. Dickson,² J-C. Royer,⁴ O. Doclot,¹ A. Lagha,³ M. Aminpur,³ D. Galpin,¹ and C. Chaton⁴
¹STMicroelectronics, Crolles, France
²Revera, Incorporated, Sunnyvale, CA
³Freescale, Crolles, France
⁴CEA/LETI, Grenoble, France
- 038** Development of a Focused-Beam Ellipsometer Based on a New Principle
S. H. Ye, Y. K. Kwak, S. H. Kim, H. M. Cho, Y. J. Cho, and W. Chegal
Korea Advanced Institute of Science and Technology, Yuseong-Gu, Republic of Korea
- 039** Measuring Submicron Trench Structures with Model-Based Infrared Reflectometry
A. A. Maznev, A. Mazurenko, C. Duran, and M. Gostein
Advanced Metrology Systems, Natick, MA
- 040** Dose and Profile Accuracy in SIMS Depth Profiles of Ultra-low Energy Boron Ion Implants in Silicon
C. W. Magee,¹ R. S. Hockett,² T. H. Buyuklimanli,¹ J. W. Marino,¹ I. Abdelrehim,³ and M-H. Yang²
¹Evans Analytical Group, East Windsor, NJ
²Evans Analytical Group, Sunnyvale, CA
³Evans Analytical Group, Peabody, MA
- 041** Silicon Loss Metrology Using Synchrotron X-ray Reflectance and Bragg Diffraction
M. Bhargava,¹ W. Donner,¹ A. Srivastava,² and J. C. Wolfe¹
¹University of Houston, Houston, TX
²Axcelis Technologies, Beverly, MA
- 042** Enhancement of Infrared Spectroscopy Capabilities for Nanoelectronic and Nanotechnology Applications
N. Rochat, V. Loup, P. Besson, C. Oillic, P. Mur, A. C. Demas, and P. Gergaud
CEA-LETI, Grenoble, France
- 043** Use of Drop-on-Demand Inkjet Printing Technology to Produce Trace Level Contamination Standards For the Semiconductor Industry
E. Windsor, G. Gillen, and C. Szakal
National Institute of Standards and Technology, Gaithersburg, MD
- 044** Nano-Raman: Monitoring Nanoscale Stress
J-H. Zollondz, B. Uhlig, M. Haberjahn, H. Bloß, and P. Kücher
Analytics at Qimonda Dresden GmbH & Co. OHG, Dresden, Germany
- 045** Extending Conventional Scatterometry Using Generalized Ellipsometry
P. Reinig,¹ T. Geiler,¹ M. Mört,¹ T. Hingst,¹ H. Bloß,¹ J. Renger,² and L. M. Eng²
¹Qimonda, Dresden, Germany
²Technische Universität Dresden, Dresden, Germany

- 046** Thin-Film Nanocalorimetry: a New Approach to the Evaluation of Interfacial Stability for Nanoelectronic Applications
L. Cook,¹ R. Cavicchi,¹ L. Allen,² and M. Green¹
¹*National Institute of Standards and Technology, Gaithersburg, MD*
²*University of Illinois, Urbana, IL*
- 047** Characterization of Nanoparticle Sizes Under 2006 APEC Interlaboratory Comparison
W-E. Fu, H-L. Lin, and C-Y. Wang
Center for Measurement Standards, Industrial Technology Research Institute, Taiwan, R.O.C.
- 048** Strength and Fracture Measurements at the Nano Scale
E. R. Fuller, D. L. Henann, and R. F. Cook
National Institute of Standards and Technology, Gaithersburg, MD
- 049** Investigation of Apertureless NSOM for Measurement of Stress in Strained Silicon
C. McDonough, J. Atesang and R. E. Geer
University at Albany, SUNY, Albany, NY
- 050** Metrology and Optical Characterization of PECVD (RF) Low Temperature Deposited Amorphous Carbon Films
F. Ferrieu,¹ C. Chaton,¹ D. Neira,¹ L. Proenca Mota,¹ A. M. Papon,² A. Tarnowka,³ and C. Beitia⁴
¹*STMicroelectronics, Crolles, France*
²*CEA-LETI, Grenoble, France*
³*NXP, Crolles, France*
⁴*KLA-Tencor, Meylan, France*
- 051** Imaging Buried Structures and Pattern Recognition using Scanning Near Field Ultrasound Holography (SNFUH)
G. Shekahwat and V. Dravid
Northwestern University, Department of Material Science and Engineering and NUANCE Center, Evanston, IL
- 052** Distribution Correction for Rapid, High Precision XPS Measurements of Thickness and Dose
W. Nieveen
Evans Analytical Group LLC, Sunnyvale, CA
- 053** Helium Ion Microscopy: a New Disruptive Technology for Semiconductor Metrology
M. T. Postek, A. E. Vladar, J. Villarrubia, L. A. Stern, J. Notte, and S. McVey
National Institute of Standards and Technology, Gaithersburg, MD
Alis Corporation, Peabody, MA
- 054** Need for Standardization of EBSD Measurements for Microstructural Characterization
R. H. Geiss and D. T. Read
National Institute of Standards and Technology, Boulder, CO

- 055** Characterizing the Temperature Dependent Properties of Thin-Films Using a Wafer-Scale Bulge Test
M. G. da Silva
Exponent Inc., Natick, MA
- 056** Manufacture and Metrology of Ultra-Flat 300mm Silicon Wafers
U. Griesmann,¹ Q. Wang,¹ M. Tricard,² P. Dumas,² and C. Hall²
¹*National Institute of Standards and Technology, Gaithersburg, MD*
²*QED Technologies Inc., Rochester, NY*
- 057** Real-Time High Resolution Wafer Mapping for Advanced Ion Implant Process Control
K. Gurcan,¹ A. Bertuch,² and K. Steeples²
¹*National Semiconductor, South Portland, Maine*
²*QC Solutions, Billerica, Massachusetts*
- 058** Chemical Mechanical Planarization (CMP) Metrology for 45/32 nm Technology Generations
A. Nutsch and L. Pfitzner
Fraunhofer Institute for Integrated Systems and Device Technology, Erlangen, Germany
- 059** Laser Scattering: a Fast, Sensitive, In-line Technique for Advanced Process Development and Monitoring
E. Nolot,¹ B. Arrazat,¹ S. Favier,² Y. Borde,² J.F. Damlencourt,¹ B. Vincent,¹ O. Kermarrec,² V. Carron,¹ F. Nemouchi,¹ P. Vandelle,¹ Y. Bogumilowicz,¹ and A. Danel¹
¹*CEA-LETI, MINATEC, Grenoble, France*
²*ST Microelectronics, Crolles, France*
- 060** Electron Diffraction-Based Strain Measurements of Enhanced Mobility Devices
P. Fejes,¹ G. Tam,¹ J. Conner,² S. Murphy,² V. Vartanian,² and A. Thean²
¹*Freescale Semiconductor Inc., Tempe, AZ*
²*Freescale Semiconductor Inc., Austin, TX*
- 061** X-ray Reflectivity Measurements of Nanoscale Structures: Limits of the Effective Medium Approximation
H-J. Lee, C. L. Soles, S. Kang, H. W. Ro, E. K. Lin, and W-l. Wu
National Institute of Standards and Technology, Gaithersburg, MD
- 062** CMP Control of Multi-Layer Inter-Layer Dielectrics (ILD) Using X-ray Reflectivity
R. E. Bryant,¹ H. Porter,¹ J. Gallegos,² J. O'Dell,² and D. Agnihotri²
¹*Rohm and Haas Electronic Materials, Phoenix, AZ*
²*Jordan Valley Semiconductors, Inc., Austin, TX*
- 063** Asymmetric Relaxation of SiGe in Patterned Si Line Structures
M. Wormington,¹ T. Lafford,² S. Godny,^{2,3} P. Ryan,² R. Loo,⁴ N. Bhourri,^{4,5} and M. Caymax⁴
¹*Bede Scientific Inc., Englewood, CO*
²*Bede X-Ray Metrology, Durham, UK*
³*Nova Measuring Instruments Ltd., Rehovot, Israel*
⁴*IMEC, Leuven, Belgium*
⁵*Institut National Polytechnique de Grenoble, Grenoble, France*

- 064** A High Brilliance, Small Spot X-ray Beam Delivery Solution for In-line X-ray Metrology
P. Hoghoj, P. Boulée, and L. Spanos
Xenocs SA, Sassenage, France
- 065** A NIST Method for Determining Model-Independent Structural Information by X-Ray Reflectometry
D. Windover,¹ N. Armstrong,^{1,3} P. Y. Hung,² J. P. Cline,¹ S. C. Song,² and A. Diebold²
¹*National Institute of Standards and Technology, Gaithersburg, MD*
²*SEMATECH, Austin, TX*
³*UTS, Sydney, Australia*
- 066** Withdrawn
- 067** A NIST Method for Model Selection Using Bayesian Techniques in X-ray Reflectometry
N. Armstrong,^{1,3} D. Windover,¹ P. Y. Hung,² J. P. Cline,¹ S. C. Song,² and A. Diebold²
¹*National Institute of Standards and Technology, Gaithersburg, MD*
²*SEMATECH, Austin, TX*
³*UTS, Sydney, Australia*
- 068** Withdrawn
- 069** X-Ray Metrology for 45nm and Beyond
V. Vartanian, K. Junker, J. Smith, D. Triyoso, M. Raymond, S. Zollner, D. Roan, J. Hildreth, V. Dhandapani, and R. Powers
Freescale Semiconductor, Inc., Austin, TX
- 070** Coupling of Advanced Optical and Chemical Characterization Techniques for Optimization of High-k Dielectrics with Nanometer Range Thickness
C. Licitra, E. Martinez, N. Rochat, T. Veyron, H. Grampeix, M. Gely, J. P. Colonna, and G. Molas
CEA-LETI, Grenoble, France
- 071** Combinatorial Methodologies Applied to the Advanced CMOS Gate Stack and Channel
K.-S. Chang,¹ N. D. Bassim,¹ P. K. Schenck,¹ J. Suehle,¹ I. Takeuchi,² and M. L. Green¹
¹*National Institute of Standards and Technology, Gaithersburg, MD*
²*University of Maryland, College Park, MD*
- 072** Distinguishability of N Composition Profiles in SiON Films on Si by Angle-Resolved X-ray Photoelectron Spectroscopy
C. J. Powell,¹ W. S. M. Werner,² and W. Smekal²
¹*National Institute of Standards and Technology, Gaithersburg, MD*
²*Vienna University of Technology, Vienna, Austria*
- 073** Optical Properties of Atomic-Layer-Deposited HfSiO Films Determined by Spectroscopic Ellipsometry
Y. J. Cho, H. M. Cho, and W. Chegal
Korea Research Institute of Standards and Science, Yuseong-Gu, Republic of Korea

- 074** Internal Photoemission Spectroscopy of Metal Gate/High-k/Semiconductor Interfaces
N. V. Nguyen, H. D. Xiong, O. Kirillov, and J. S. Suehle
National Institute of Standards and Technology, Gaithersburg, MD
- 075** Characterization of Nitrogen Content/Distribution in SiON Gate Dielectrics Using Angle-Resolved X-Ray Photoelectron Spectroscopy (AR-XPS) and Aberration Corrected Scanning Transmission Electron Spectroscopy (Cs-STEM)
C. Lazik, G. Conti, Y. Uritsky, T. C. Chua, and C. Czarnik
Applied Materials, Santa Clara, CA
- 076** Suppression of π -bonding Interactions in Elemental and Complex High-k Oxide Dielectrics
G. Lucovsky,¹ H. Seo,¹ L.B. Fleming,¹ M. D. Ulrich,¹ and J. Lüning²
¹*North Carolina State University, Raleigh, NC*
²*Stanford Synchrotron Radiation Laboratory, Menlo Park, CA*
- 077** Thin Film Thickness and Composition Metrology for Process Development and Control
M. Weldon
Metrosol, Inc., Austin, TX
- 078** Thin Films Characterization by Ultra Trace Metrology
A. Danel,¹ S. Lhostis,² Y. Campidelli,² S. Olivier,¹ T. Lardin,¹ E. Nolot,¹ and E. Martinez¹
¹*CEA-LETI, MINATEC, Grenoble, France*
²*ST Microelectronics, Crolles, France*
- 079** Applications of X-Ray Reflectometry to Develop and Monitor FEOL Processes for sub-45nm Technology Nodes
E. Nolot,¹ Y. Bogumilowicz,¹ S. Lhostis,² and A. Danel¹
¹*CEA-LETI, MINATEC, Grenoble, France*
²*ST Microelectronics, Crolles, France*
- 080** Gate Metal-induced Diffusion and Interface Reactions in Hf Oxide Films on Si
L. V. Goncharova,¹ M. Dalponte,¹ E. Garfunkel,¹ T. Gustafsson,¹ P. S. Lysaght,² and G. I. Bersuker²
¹*Rutgers University, Piscataway, NJ*
²*SEMATECH, Austin, Texas*
- 081** Ellipsometry Porosimetry: Fast and Non Destructive Technique to Characterize Porosity of Cubic Mesoporous TiO₂ Thins Films
L. Kitzinger,¹ J. P. H. Piel,² C. DeFranoux,² Y. Turcant,² D. Grosso,³ and C. Boissiere³
¹*SOPRA Inc., Menlo Park, CA*
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W. Chu,¹ J. Fu,² R. Dixon,² and T. Vorburger²
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